

## General

### Guideline Title

Guidelines for the use of local anesthesia in office-based dermatologic surgery.

### Bibliographic Source(s)

Kouba DJ, LoPiccolo MC, Alam M, Bordeaux JS, Cohen B, Hanke CW, Jellinek N, Maibach HI, Tanner JW, Vashi N, Gross KG, Adamson T, Begolka WS, Moyano JV. Guidelines for the use of local anesthesia in office-based dermatologic surgery. J Am Acad Dermatol. 2016 Jun;74(6):1201-19. [141 references] [PubMed](#)

### Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

## Recommendations

### Major Recommendations

Level of evidence grades (I-III) and strength of recommendations (A-C) are defined at the end of the "Major Recommendations" field.

#### Recommendations for the Use of Topical Anesthesia in Dermatologic Surgery

- Noncocaine formulations are preferred over cocaine formulations and recommended for use in office-based procedures.
- Topical agents are recommended as a first-line method of anesthesia for nonablative laser treatments.
- Topical anesthesia can be used for performing office-based procedures, such as skin biopsy, small excisions, and filler and botulinum toxin injections.
- The use of topical anesthetic agents is recommended to lessen the pain of injection and reduce the dose of infiltration anesthesia needed for larger procedures.
- Topical lidocaine is safe for use on pregnant or nursing women, but there is insufficient evidence to recommend use of other topical anesthetics.
  - Elective procedures and those not of urgent medical necessity requiring topical lidocaine in pregnant women should be postponed until after delivery.
  - Procedures of urgent medical necessity should be delayed until at least the second trimester when possible.
- Topical agents are recommended as a first-line method of anesthesia for the repair of dermal lacerations in children and for other minor dermatologic procedures, including curettage. For skin biopsy, excision, or other cases where topical agents alone are insufficient, adjunctive use of topical anesthesia to lessen the discomfort of infiltrative anesthetic should be considered.
- For more extensive surgery, the combination of topical and infiltration anesthesia should be considered as an alternate to sedation or general

anesthesia in pediatric patients.

#### Strength of Recommendations for Use of Topical Anesthesia in Dermatologic Surgery

Recommendation	Strength of Recommendation	Level of Evidence	References
Use of noncocaine topical anesthetics	A	II	Eidelman et al., 2005
Topical anesthesia as the first-line method for nonablative laser treatments	C	III	Bryan & Alster, 2002; Kilmer et al., 2003
Topical anesthesia for use in minor skin procedures in adults	C	III	Bryan & Alster, 2002; Kilmer et al., 2003; Franchi et al., 2009; Jones & Nandapalan, 1999; Goodacre et al., 1988; Russell, Desmond, & Fox, 1988; Ferguson, Loryman, & Body, 2005; Hallen, Ljunghall, & Wallin, 1987; Gupta & Sibbald, 1996
Topical anesthesia to reduce the pain of local anesthetic injection	C	III	Expert opinion
Use of limited amounts of topical lidocaine in pregnant and nursing women	C	III	Murase, Heller, & Butler, 2014; Gormley, 1990; Richards & Stasko, 2002; Butler, Heller, & Murase, 2014
Postpone use of topical anesthesia until after delivery or second trimester when possible	C	III	Expert opinion
Against use of nonlidocaine topical anesthetics in pregnant or nursing women	C	III	Expert opinion
Use of topical anesthesia as the first-line method for repair of dermal lacerations in children	A	I, II	Ferguson, Loryman, & Body, 2005; Bonadio & Wagner, 1988; Hegenbarth et al., 1990; Smith et al., 1998; Smith et al., 1996; Smith & Barry, 1990; Zempsky & Karasic, 1997
Use of topical anesthesia as the first-line method for other minor procedures in children	C	III	Expert opinion
Adjunctive use of topical anesthesia to minimize discomfort of infiltrative anesthesia in children	C	III	Expert opinion
Topical and infiltrative anesthesia used as an alternate to sedation and general anesthesia in children	C	III	Ferguson, Loryman, & Body, 2005; Bonadio & Wagner, 1988; Hegenbarth et al., 1990; Smith et al., 1998; Smith et al., 1996; Smith & Barry, 1990; Zempsky & Karasic, 1997; Pierluisi & Temdrup, 1989; Priestley et al., 2003

#### Recommendations for the Use of Local Infiltrative Anesthesia in Dermatologic Surgery

- Infiltrative anesthesia is safe and recommended for office-based dermatologic procedures, including but not limited to obtaining a biopsy specimen, excision, wound closure, tissue rearrangement, skin grafting, cauterization, nonablative laser, and ablative skin resurfacing.
- Infiltrative anesthesia may be combined with other forms of local anesthesia for larger or more complex cutaneous procedures, including but not limited to:
  - Full-face ablative laser resurfacing, combined with topical and nerve block anesthesia
  - Follicular unit hair transplantation, combined with tumescent local anesthesia.
- The maximum safe dose of local infiltrated anesthesia is unknown.
- For adults, no more than 4.5 mg/kg of lidocaine and 7.0 mg/kg of lidocaine with epinephrine should be administered in a single treatment.
- For children, no more than 1.5-2.0 mg/kg of lidocaine and 3.0-4.5 mg/kg of lidocaine with epinephrine should be administered in a single treatment.
- For a multistage procedure, such as Mohs micrographic surgery, a maximum dose of local infiltrative anesthesia of 50 mL of 1% lidocaine solution (500 mg) delivered over several hours is recommended.

- Use of either ester-type local anesthetics, bacteriostatic normal saline, or 1% diphenhydramine is suggested as an alternate form of local infiltration anesthesia for patients with true allergy to lidocaine.
- Steps recommended to decrease the risk of local anesthetic systemic toxicity:
  - Use the lowest effective dose of local anesthetic.
  - Aspirate the needle/catheter prior to each injection to avoid introducing the drug directly into a vessel.
  - Use incremental injections of anesthetic.
  - Continually assess and communicate with the patient to monitor for signs of early toxicity.

#### Strength of Recommendations for the Use of Local Infiltrative Anesthesia in Dermatologic Surgery

Recommendation	Strength of Recommendation	Level of Evidence	References
Use of local infiltrative anesthesia for obtaining a biopsy specimen, excision, wound closure, tissue rearrangement, skin grafting, cauterization, nonablative laser, and ablative skin resurfacing	C	III	Expert opinion
Combining methods of local anesthesia for full-face ablative laser and follicular unit hair transplantation	C	III	Expert opinion
Maximum dose of 4.5 mg/kg of lidocaine and 7.0 mg/kg of lidocaine with epinephrine for adults	C	III	Hancox et al., 2004; Klein, 1993; Drake et al., 1995
Maximum dose of 1.5-2.0 mg/kg of lidocaine and 3.0-4.5 mg/kg of lidocaine with epinephrine for children	C	III	Hancox et al., 2004
Max dose of 500 mg of lidocaine for a multistage Mohs micrographic surgery	B	II	Alam et al., 2010
Use of ester type local anesthetics for patients with lidocaine allergy	C	III	Bhole et al., 2012
Use of diphenhydramine for patients with lidocaine allergy	C	III	Green, Rothrock, & Gorchynski, 1994; Xia et al., 2002
Use of bacteriostatic normal saline for patients with lidocaine allergy	C	III	Bartfield, Jandreau, & Raccio-Robak, 1998
Prevention of local anesthetic systemic toxicity	A	I, II	Neal et al., 2010; Neal, Mulroy, & Weinberg, 2012; Mercado & Weinberg, 2011

#### Recommendations for Mixing and the Use of Additives to Local Infiltrative Anesthesia in Dermatologic Surgery

##### Epinephrine

- The addition of epinephrine to local infiltration anesthesia is safe and recommended for use on the ear, nose, hand, feet, and digits.
- The addition of epinephrine to local infiltration anesthesia may be considered for use during procedures on the penis.
- Local infiltrative anesthesia with epinephrine may be used in small amounts in women who are pregnant:
  - Elective procedures and those not of urgent medical necessity requiring lidocaine with epinephrine should be postponed until after delivery.
  - Procedures of urgent medical necessity should be delayed until the second trimester when possible.
  - In case of doubt, consult with the patient's obstetrician.
- Local infiltrative anesthesia with epinephrine may be administered to patients with stable cardiac disease. If uncertain of a patient's ability to tolerate epinephrine, consult with the patient's cardiologist.
- Use of the lowest effective concentration of epinephrine to provide pain control and vasoconstriction in local infiltrative anesthesia is recommended.

##### Hyaluronidase

- Hyaluronidase may be used as an additive to local infiltration anesthesia to ease diffusion and reduce contour distortion, yet there are insufficient data to support a recommendation for its routine use in dermatologic surgery.

- Hyaluronidase should not be administered to patients with a known bee venom allergy.

## Buffering

- The addition of sodium bicarbonate to local anesthetic, particularly lidocaine with epinephrine, is recommended to decrease the pain of delivery by subcutaneous or intradermal infiltration.
- Preinjection of buffered lidocaine solution is suggested to reduce the pain of bupivacaine infiltration.

## Mixing Local Anesthetics

It is unclear whether mixing multiple anesthetics for local infiltration poses further benefit over use of a single agent.

### Strength of Recommendations for Mixing and the Use of Additives to Local Infiltrative Anesthesia in Dermatologic Surgery

Recommendation	Strength of Recommendation	Level of Evidence	References
Addition of epinephrine to local anesthesia on the ear, nose, and digits	A	I, II	Altinyazar et al., 2004; Chowdhry et al., 2010; Denkler, 2001; Denkler, 2005; Häfner et al., 2008; Krunic et al., 2004; Lalonde et al., 2005; Radovic, Smith, & Shumway, 2003; Sonohata et al., 2012; Wilhelmi et al., 2001; Häfner, Rocken, & Breuninger, 2005
Addition of epinephrine to local anesthesia on the penis	B	II	Schnabl et al., 2014
Addition of epinephrine to local anesthesia in women who are pregnant or nursing	B	II	Murase, Heller, & Butler, 2014
Addition of epinephrine to local anesthesia in patients with stable cardiac disease	B	I, II	Serrera Figallo et al., 2012; Niwa et al., 2001
Addition of epinephrine to local infiltrative anesthesia at the lowest effective concentration	B	II, III	Dunlevy, O'Malley, & Postma 1996; Gessler et al., 2001; Liu et al., 1995
Against addition of hyaluronidase to local anesthesia in patients with bee venom allergy	B	II	Kirby et al., 2001
Against use of hyaluronidase to reduce tissue distortion and improve undermining	C	III	Clark & Mellette, 1994; Landsman & Mandy, 1991
Addition of sodium bicarbonate to reduce pain of local anesthetic infiltration	A	I, II	Masters, 1998; Stewart et al., 1990; Stewart, Cole, & Klein, 1989; Welch et al., 2012; Burns et al., 2006
Preinjection of buffered lidocaine to reduce pain of bupivacaine injection	C	III	Expert opinion
Mixing multiple anesthetics for the same procedure	C	II	Gadsden et al., 2011; Lai, Sutton, & Nicholson, 2003; Nicholson, Sutton, & Hall, 2000; Ozdenir et al., 2004; Ribotsky, Berkowitz, & Montague, 1996; Seow et al., 1982; Sweet, Magee, & Holland, 1982; van den Berg & Montoya-Pelaez, 2001

### Recommendations for Minimizing Pain of Administration of Local Infiltration Anesthesia and Alternate Methods of Analgesia in Dermatologic Surgery

- Slow rate of infiltration, vibration of the skin, use of a warm solution, or cold air skin cooling should be considered to decrease the pain of local anesthetic injection.
- It is unclear whether pretreatment with ethyl chloride spray, preinjection with normal saline, or verbal distraction decreases the pain of local anesthetic infiltration.

- There is contradictory evidence regarding the effectiveness of ethyl chloride, and its use as a sole method for analgesia in dermatologic procedures should not be considered.
- Cold air skin cooling may be considered to reduce patient discomfort during nonablative laser therapy.
- Use of a skin-vibrating device may be considered to help decrease the pain of botulinum toxin injection.

#### Strength of Recommendations for Minimizing Pain of Administration of Local Infiltration Anesthesia and Alternate Methods of Analgesia in Dermatologic Surgery

Recommendation	Strength of Recommendation	Level of Evidence	References
Slow rate of infiltration, vibration of the skin, use of a warm solution, and cold air skin cooling are recommended to decrease the pain of local anesthetic injection.	B	II	Fosko, Gibney, & Harrison, 1998; Kaplan & Moy, 1996; Scarfone, Jasani, & Gracely, 1998; Al-Qarqaz et al., 2012; Fayers, Morris, & Dolman, 2010
Pretreatment with ethyl chloride spray, preinjection with normal saline, or verbal distraction to decrease the pain of local anesthetic infiltration	C	III	Expert opinion; Swinehart, 1992
Ethyl chloride as an analgesic for dermatologic procedures.	C	III	Armstrong, Young, & McKeown, 1990; Robinson et al., 2007; Selby & Bowles, 1995; Soueïd & Richard, 2007; Yoon et al., 2008; White et al., 1999
Cold air skin cooling to reduce patient discomfort during nonablative laser therapy	B	II	Hammes & Raulin, 2005; Raulin, Greve, & Hammes, 2000
Use of a skin-vibrating device to decrease the pain of botulinum toxin injection into glabellar rhytides	B	II	Sharma, Czyz, & Wulc, 2011

#### Recommendations for Nerve Blocks in Dermatologic Surgery

- Regional cutaneous nerve block anesthesia is recommended for ablative laser resurfacing of the face and botulinum toxin injection of the palm
- Nerve block should be considered as an alternative or in addition to infiltrative anesthesia for procedures on the face, hands, feet, and digits, and may provide the benefit of decreased tissue swelling/distortion, prolong anesthesia, and reduce postoperative discomfort for the patient

#### Strength of Recommendations for Nerve Blocks in Dermatologic Surgery

Recommendation	Strength of Recommendation	Level of Evidence	References
Nerve block anesthesia for ablative laser resurfacing of the face, botulinum toxin injection of the palm, and upper lid ptosis surgery	B	II	Lee, Khandwala, & Jones, 2009; Hund et al., 2004; Vadoud-Seyedi, Heenen, & Simonart, 2001; Wan et al., 2013
Nerve block as an alternate to local infiltration anesthesia for dermatologic surgery on the face and digits	C	III	Expert opinion

#### Recommendations for Tumescant Local Anesthesia in Dermatologic Surgery

- Lidocaine and prilocaine are both safe and recommended for use in tumescant local anesthesia for office-based liposuction. Bupivacaine is not recommended for this use.
- Use of prilocaine is not approved in the United States for this procedure as of the date of this publication.
- The addition of epinephrine to lidocaine is recommended and safe for use in tumescant local anesthesia for liposuction.
- A maximum dose of 55 mg/kg of lidocaine with epinephrine has been shown to be safe and can be used for tumescant local anesthesia for liposuction in patients weighing 43.6-81.8 kg.
- The use of warm anesthetic solution and a slow infiltration rate is recommended to decrease patient discomfort during administration of tumescant local anesthesia.

#### Strength of Recommendations for Tumescant Local Anesthesia in Dermatologic Surgery

Recommendation	Strength of Recommendation	Level of Evidence	References
Lidocaine and prilocaine for use in tumescent local anesthesia for office-based liposuction	A	I, II	Klein, 1990; Burk, Guzman-Stein, & Vasconez, 1996; Glowacka et al., 2009; Habbema, 2010; Lillis, 1988; Rubin et al., 1999; Augustin et al., 2010; Breuninger & Wehner-Caroli, 1998; Lindenblatt et al., 2004
The addition of epinephrine to lidocaine for use in tumescent local anesthesia for liposuction	A	I, II	Klein, 1990; Burk, Guzman-Stein, & Vasconez, 1996; Glowacka et al., 2009; Habbema, 2010; Lillis, 1988; Rubin et al., 1999
A maximum dose of 55 mg/kg of lidocaine with epinephrine for local tumescent anesthesia for liposuction	A	I	Ostad, Kageyama, & Moy, 1996
Use of a warm solution to decrease patient discomfort during administration of tumescent local anesthesia	B	II	Kaplan & Moy, 1996
Use of a slow infiltration rate to decrease patient discomfort during administration of tumescent local anesthesia	C	III	Hanke, et al., 1997

## Definitions

### Level of Evidence

- I. Good-quality patient-oriented evidence (i.e., evidence measuring outcomes that matter to patients: morbidity, mortality, symptom improvement, cost reduction, and quality of life).
- II. Limited-quality patient-oriented evidence (i.e., lower quality clinical trials, cohort studies, and case control studies)
- III. Other evidence, including consensus guidelines, opinion, case studies, or disease-oriented evidence (i.e., evidence measuring intermediate, physiologic, or surrogate end points that may or may not reflect improvements in patient outcomes)

### Grade of Recommendation

- A. Recommendation based on consistent and good-quality patient-oriented evidence.
- B. Recommendation based on inconsistent or limited-quality patient-oriented evidence.
- C. Recommendation based on consensus, opinion, case studies, or disease-oriented evidence.

## Clinical Algorithm(s)

None provided

## Scope

### Disease/Condition(s)

A variety of skin conditions requiring surgical intervention using local anesthesia provided in an office or facility outside of ambulatory surgical centers and hospital settings

Note: Anesthetic toxicity is rare in the dermatologic office setting, and therefore management of local anesthetic toxicity is not addressed in this guideline.

## Guideline Category

Management

Treatment

## Clinical Specialty

Anesthesiology

Dermatology

## Intended Users

Advanced Practice Nurses

Nurses

Physician Assistants

Physicians

## Guideline Objective(s)

- To address the clinical use and safety of local anesthetics (i.e., topical, infiltrative, nerve blocks, and infiltrative tumescent) commonly used in office-based dermatologic surgery for adult and pediatric patients
- To facilitate the selection of the most effective means of achieving local anesthesia for a variety of cutaneous procedures while also minimizing the risk of adverse events

## Target Population

Children and adults, including pregnant women, undergoing surgical procedures requiring anesthesia in office-based settings

## Interventions and Practices Considered

1. Topical anesthesia
2. Local infiltrative anesthesia
  - Additives to local infiltrative anesthesia (epinephrine, hyaluronidase, buffering)
  - Methods to minimize pain of administration of local infiltration anesthesia
3. Nerve blocks/regional anesthesia
4. Tumescent local anesthesia

## Major Outcomes Considered

- Analgesic efficacy
- Pain intensity
- Need for additional anesthetics
- Duration of anesthesia
- Patient satisfaction
- Pregnancy outcomes
- Adverse effects

## Methodology

Method Used to Collect/Select the Evidence

## Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

## Description of Methods Used to Collect/Select the Evidence

Evidence was obtained for the clinical questions determined by the work group (see the "Description of the Methods Used to Formulate the Recommendations" field) using a systematic search of PubMed and Google Scholar databases from January 1960 through June 2014. Searches were prospectively limited to publications in the English language. Medical Subject Headings (MeSH) terms and strings used in the literature search included dermatology, skin, office-based surgery, local anesthesia, infiltration, topical anesthesia, lidocaine, tetracaine, prilocaine, marcaine, bupivacaine, etidocaine, mepivacaine, procaine, ester, amide, structure, comparison, efficacy, safety, risk, nerve blocks, tissue, face, head, neck, nose, ear, eye, lid, hands, feet, digits, penis, genitals, pregnancy, pediatrics, pain, tissue absorption, dose, time, slow, fast, volume, pharmacokinetics, serum levels, technique, method, laser, ethyl chloride, symptoms, systemic, toxicity, local anesthetic systemic toxicity (LAST), treatment, prevention, epinephrine, adrenaline, vasoconstriction, hyaluronidase, mixtures, solution, needle, cannula, sodium bicarbonate, pH, infusion rate, and tumescent anesthesia.

### Exclusion and Inclusion Criteria for Study Selection

#### Inclusion Criteria

##### *Type of Study*

- Control of exposure: interventional, observational
- Timing: prospective, retrospective
- Design: evidence-based clinical guidelines; systematic reviews and meta-analyses; randomized controlled trials; non-randomized clinical trials; cross-sectional studies and cohort studies; case control studies; case reports

##### *Outcomes*

- Preference for outcomes that matter to patients and help them live longer or better lives (reduced mortality, symptom improvement, improved quality of life, increased safety, etc.)
- Depending on the clinical question, disease-oriented evidence outcomes were also considered (measurement of intermediate, physiologic, or surrogate end points that may or may not reflect improvements in patient outcomes (e.g., blood loss, chemistry, anesthetic plasma levels, physiologic function, etc.).

##### *Language*

Studies only in English

##### *Publication*

Full-text available

#### Exclusion Criteria

- Type of study: animal studies, in-vitro research, letters
- Outcomes: No patient-oriented outcomes measured
- Language: Non-English studies
- Publication: Only abstract or no abstract

A total of 599 abstracts were initially assessed for possible inclusion. After removal of duplicate data and nonrelevant studies, 165 abstracts were retained and used for a secondary, manual search identifying 36 additional relevant studies.

## Number of Source Documents

A total of 201 studies were included.

## Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

### Rating Scheme for the Strength of the Evidence

Evidence was graded using a 3-point scale based on the quality of methodology as follows:

- I. Good-quality patient-oriented evidence (i.e., evidence measuring outcomes that matter to patients: morbidity, mortality, symptom improvement, cost reduction, and quality of life)
- II. Limited-quality patient-oriented evidence (i.e., lower quality clinical trials, cohort studies, and case control studies)
- III. Other evidence, including consensus guidelines, opinion, case studies, or disease-oriented evidence (i.e., evidence measuring intermediate, physiologic, or surrogate end points that may or may not reflect improvements in patient outcomes)

## Methods Used to Analyze the Evidence

Systematic Review with Evidence Tables

### Description of the Methods Used to Analyze the Evidence

Once the full data set of 201 studies was collated, each study was reviewed and ranked based on relevance and the level of evidence for the outlined clinical questions. Evidence tables were generated for included studies and used by the work group in developing recommendations.

The available evidence was evaluated using a unified system called the Strength of Recommendation Taxonomy (SORT) that was developed by editors of the United States family medicine and primary care journals (i.e., *American Family Physician*, *Family Medicine*, *Journal of Family Practice*, and *BMJ USA*). Evidence was graded using a 3-point scale based on the quality of methodology (e.g., randomized control trial, case control, prospective or retrospective cohorts, case series, etc.) and the overall focus of the study (i.e., diagnosis, treatment, prevention, screening, or prognosis). (See the "Rating Scheme for the Strength of the Evidence" field.)

## Methods Used to Formulate the Recommendations

Expert Consensus

### Description of Methods Used to Formulate the Recommendations

A work group composed of 8 dermatology experts practicing in office settings and in academic institutions, 1 anesthesiologist, and 1 patient advocate was convened to determine the scope of the guideline, and to identify important clinical questions in the use and safety of local anesthesia in office settings.

Clinical questions used to structure the evidence review for the use of local anesthesia in the office-based setting:

#### Topical Anesthesia

- Is topical anesthesia safer/more effective than other types of anesthesia to reduce pain?
- Are the same topical anesthetics used in adults also recommended/safe in pregnancy and lactation?
- Are the same topical anesthetics used in adults also recommended/safe in children?

#### Local Infiltration Anesthesia

- Is local infiltration anesthesia safer/more effective than other types of anesthesia to reduce pain?
- Does the method to calculate the maximum anesthetic doses change when infiltrated anesthetics are delivered over an extended time period

compared to a short time period?

- Do the local anesthetic serum levels change based on the method of delivery?
- Is there a measure of care better/safer than others in decreasing the symptoms of systemic toxicity?
- Does the addition of epinephrine to infiltrated anesthetics increase safety risks in cardiac and pregnant patients, or for use in the digits, nose, and penis, compared to infiltrated anesthetics alone?
- Is a lower concentration of epinephrine as effective as high concentrations added to infiltrated anesthetics to produce vasoconstriction?
- Do the maximum recommended doses and delivery methods both in adults and children differ by the addition of epinephrine?
- Does the addition of hyaluronidase increase the diffusion rate and effectiveness/safety of infiltrative anesthetics?
- Does mixing multiple anesthetics pose a benefit to the patient compared to a single anesthetic for the same procedure?
- Does the addition of sodium bicarbonate to anesthetics decrease patients' pain when administered by subcutaneous infiltration?
- Does the use of a particular injection represent a clinical benefit for the patient?
- Does the use of other commonly used techniques minimize pain?

#### Nerve Block/Regional Anesthesia

- Does nerve block/regional anesthesia represent a clinical benefit over local infiltrative anesthesia for the head and neck, hands, feet, and genitals?
- Does the injection of local anesthesia in the optimal entry points for the head and neck, hands, feet, and genitals pose an increased risk of nerve damage from needle trauma and of toxicity?

#### Tumescent Anesthesia

- Is the use of lidocaine in tumescent anesthesia safer than other anesthetics for the same procedure?
- Does the volume and dose of lidocaine and epinephrine correlate with patient safety in tumescent anesthesia?
- Does a slow infusion rate result in less pain or a better anesthetic effect than fast infusion rates?
- Is there a measure of care better/safer than others to decrease symptoms of local anesthetic systemic toxicity for patients anesthetized using the tumescent technique?

Clinical recommendations were developed based on the best available evidence tabled in the guideline. In situations where documented evidence-based data were not available, or showing inconsistent or limited conclusions, expert opinion and medical consensus were used to generate clinical recommendations.

## Rating Scheme for the Strength of the Recommendations

Clinical recommendations were developed based on the best available evidence. These are ranked as follows:

- A. Recommendation based on consistent and good-quality patient-oriented evidence.
- B. Recommendation based on inconsistent or limited-quality patient-oriented evidence.
- C. Recommendation based on consensus, opinion, case studies, or disease-oriented evidence.

## Cost Analysis

A systematic review of 22 trials encompassing >3000 patients was conducted to identify noncocaine anesthetics that were potentially less costly yet equally effective as those that contain cocaine. The review found no significant difference in efficacy among topical tetracaine-epinephrine-cocaine and 6 different cocaine-free formulations, but the addition of cocaine was associated with a higher cost and potential for adverse effects. Although no firm recommendation supporting the use of any single noncocaine formulation over another can be made, it is the opinion of this work group that because of the increased cost and potential for adverse events, noncocaine anesthetics are preferred over those containing cocaine for use in office-based dermatologic surgery.

## Method of Guideline Validation

Internal Peer Review

## Description of Method of Guideline Validation

This guideline has been developed in accordance with the American Academy of Dermatology (AAD)/AAD *Association Administrative Regulations for Evidence-based Clinical Practice Guidelines* (version approved May 2012), which includes the opportunity for review and comment by the entire AAD membership and final review and approval by the AAD Board of Directors.

## Evidence Supporting the Recommendations

### References Supporting the Recommendations

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## Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

## Benefits/Harms of Implementing the Guideline Recommendations

### Potential Benefits

Appropriate use of local anesthesia in office-based dermatologic surgery

### Potential Harms

- Many topical anesthetic agents are effective and safe for use in dermatologic procedures with a low risk of adverse events. However, caution must be taken when occlusion is used or large surface areas are treated because there are no data supporting standard practice. This is particularly true with compounded mixtures and nonstandard doses, which although rarely used by dermatologists may increase the risk of adverse events and even death.
- The risk of toxicity of topical anesthetics in children, although rare, is increased by differences in children's body surface area (BSA) relative to weight and by a lack of linear relationship between BSA and drug exposure or response. Potential adverse effects include methemoglobinemia with application of eutectic mixtures of lidocaine and prilocaine (equal mixtures of the 2 solid compounds by weight, which forms an oil above 18° C), and symptoms of local anesthetic systemic toxicity (LAST), which may occur from any topical anesthetic. The recommendations for use provided in the package insert for each specific medication should be followed to avoid these complications.
- Allergy to lidocaine is rare, with a genuine immunologic reaction representing only 1% of all adverse reactions to topical anesthetic medications.
- Although there is great interpatient variability in the manifestations of LAST, the signs and symptoms tend to follow a progression of central nervous system excitement. The patient may initially experience circumoral numbness, facial tingling, pressured or slurred speech, metallic taste, auditory changes, and hallucinations, which may also be accompanied by hypertension and tachycardia. As the condition evolves, seizures or central nervous system depression may develop, and severe cases may end in cardiac failure or arrest.
- The pain of administering infiltration anesthesia, coupled with the anxiety surrounding the injection, can often lead to significant discomfort for a child.
- Epinephrine is rated as a pregnancy category C drug by the U.S. Food and Drug Administration, but in small amounts appears safe for use with local infiltrative anesthesia in pregnant women. One study suggested an increase in malformations when mothers were exposed to systemic epinephrine in the first trimester. The alpha-adrenergic properties of epinephrine may cause vasoconstriction of placental blood vessels. When used in small amounts for dermatologic surgery, however, the local vasoconstriction afforded by epinephrine limits maternal blood level and placental transfer of lidocaine, and the benefits seem to outweigh the risks. Despite this, clinicians should postpone nonemergent dermatologic surgery requiring local infiltration anesthesia until after delivery to avoid undue risk. If possible, urgent surgery should be delayed until at least the second trimester. In cases where large amounts of anesthesia are necessary, consultation with the patient's obstetrician may be helpful to assess the risk to benefit ratio of the procedure.

- If considering ethyl chloride for analgesia before the use of energy-based devices, caution should be used because it is flammable. There is 1 reported case of unwanted ignition with laser therapy that caused a first-degree burn.
- Research for use of nerve blocks in dermatologic procedures has found the technique to be safe when performed in this setting. Neither nerve damage nor other major adverse events have been reported, and mild events were limited to hematoma formation and 1 case of pain at the site of ulnar nerve block, all of which were transient.
- Multiple studies estimate the rate of serious adverse events associated with tumescent local anesthesia to be 0.04% to 0.16%.

# Contraindications

## Contraindications

- There are no data available on the safety of topical anesthesia agents other than lidocaine, and their use during pregnancy and lactation is not recommended.
- Hyaluronidase should not be administered to patients with a known bee venom allergy.

# Qualifying Statements

## Qualifying Statements

Adherence to these guidelines will not ensure successful treatment in every situation. Furthermore, these guidelines should not be interpreted as setting a standard of care, or be deemed inclusive of all proper methods of care nor exclusive of other methods of care reasonably directed to obtaining the same results. The ultimate judgment regarding the propriety of any specific therapy must be made by the physician and the patient in light of all the circumstances presented by the individual patient, and the known variability and biological behavior of the disease. This guideline reflects the best available data at the time the guideline was prepared. The results of future studies may require revisions to the recommendations in this guideline to reflect new data.

# Implementation of the Guideline

## Description of Implementation Strategy

An implementation strategy was not provided.

# Institute of Medicine (IOM) National Healthcare Quality Report Categories

## IOM Care Need

Getting Better

## IOM Domain

Effectiveness

Safety

# Identifying Information and Availability

## Bibliographic Source(s)

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## Guideline Committee

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## Financial Disclosures/Conflicts of Interest

The American Academy of Dermatology (AAD) strives to produce clinical guidelines that reflect the best available evidence supplemented with the judgment of expert clinicians. Significant efforts are taken to minimize the potential for conflicts of interest to influence guideline content. The management of conflict of interest for this guideline complies with the Council of Medical Specialty Societies' Code of Interactions with Companies. Funding of guideline production by medical or pharmaceutical entities is prohibited, full disclosure is obtained and evaluated for all guideline contributors throughout the guideline development process, and recusal is used to manage identified relationships. The AAD conflict of interest policy summary may be viewed at [www.aad.org](http://www.aad.org) .

Work group members completed a disclosure of interests, which was periodically updated and reviewed throughout guideline development. If a potential conflict was noted, the work group member recused him or herself from discussion and drafting of recommendations pertinent to the topic area of the disclosed interest.

The below information represents the authors disclosed relationships with industry. Relevant relationships requiring recusal for drafting of guideline recommendations and content were not noted for this guideline.

Murad Alam, MD, served as consultant for Amway Corporation, receiving honoraria, and as Principal Investigator (PI) for OptMed, receiving grants with no personal compensation received.

Bernard Cohen, MD, served on the Advisory Board of Sanofi-Aventis, receiving honoraria.

C. William Hanke, MD, received honoraria serving on the Advisory Board of Allergan, Inc, as consultant for Orlando Dermatology Aesthetic & Clinical, as speaker for LEO Pharma and Genentech, Inc, and in other roles for Educational Testing and Assessment Systems, Inc and for SanovaWorks. In addition, Dr Hanke served as PI in grants funded by Allergan, Inc, Derm Advance, Genentech, Inc, and LEO Pharma, and received compensation for patent royalties or other compensation for intellectual property rights from Elsevier, Informa HealthCare, and Springer Science & Business Media.

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## Guideline Status

This is the current release of the guideline.

This guideline meets NGC's 2013 (revised) inclusion criteria.

## Guideline Availability

Available from the [Journal of the American Academy of Dermatology Web site](#) .

## Availability of Companion Documents

None available

## Patient Resources

None available

## NGC Status

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